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Fed Up with Diseases

Small things come first in tackling big diet-related diseases.

With their knowledge of plants, animals, nutrition and molecular biology, the U. S. Department of Agriculture (USDA) and Land-Grant university scientists play a key role in the nation's quest to combat diet-related diseases. Working with their medical counterparts, agricultural researchers delve into the cells of plants and animals to understand how the different components interact to either fight or trigger diseases. These basic research findings are crucial for developing diagnostic tests, medicines and vaccines, and enhancing foods so that they contain less fat and more of the nutrients shown to prevent diseases.

Payoff

- **Cancer is coming – get back to the compound!** According to the National Cancer Institute, one-third of all cancer deaths are linked to diet. Researchers are working to better understand how compounds in foods can help prevent cancer and to develop foods with more of these compounds. **South Dakota State** dairy researchers have discovered a way to increase levels of cancer-preventing fatty acids that occur naturally in milk. When they fed butter with more of these fatty acids to rats with colon cancer, the incidence of the cancer was reduced by 50 percent. **Washington State** scientists are conducting similar studies with Cheddar cheese. **Purdue** researchers have found that drinking more than four cups a day of green tea can slow or prevent the growth of cancer cells. **Iowa State** researchers have discovered that soybeans provide the most significant sources of isoflavones, a proven cancer-fighting compound. They have developed a Web database that lists isoflavone-rich foods.

- **New technologies from small beginnings.** Plant scientists at **Rutgers** have developed fast, cost-effective methods to identify and harvest compounds from plants that could be important in developing new medicines. These technologies have shortened discovery time fivefold and have allowed companies to bypass the costly research phase, which can cost up to $200 million per compound. **Texas A&M** entomologists have created a safer and easier way to abundantly produce proteins needed to develop vaccines and diagnostic tests for infectious diseases. The medical field has used this technology to develop the first FDA-approved urine test to detect HIV and blood tests for diagnosing hepatitis C. **North Carolina State** biochemists have devised a fast, cost-efficient diagnostic test that simultaneously

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measures various lipoproteins that determine heart disease – a first in the medical industry. This technology is available to physicians nationally so that they can identify high-risk patients and counsel them about diet, exercise and drug therapy.

- **Free radicals beware - antioxidants to the rescue.** Antioxidants protect cells from free radicals, which can break down a cell's DNA, protein or fats and increase the risk of disease. **Ohio State** nutrition researchers found feeding malnourished rats supplements with the antioxidant glutathione boosted the free-radical fighting capabilities of their lungs and livers – a finding that may ultimately help millions of malnourished people. **Purdue** plant geneticists have created a quick, inexpensive test to determine antioxidant levels in foods, replacing more expensive and time-consuming tests.

- **Compare and "cell" for cancer prevention. North Carolina State** poultry scientists, working with Duke University medical researchers, have found that the ovary cells of egg-laying chickens are similar to human ovaries, meaning they are a suitable model for studying the prevention of ovarian cancer in humans. **Illinois** food scientists have developed a way to determine whether foods contain compounds that affect estrogen activity, which has been shown to play an important role in the development of breast cancer. **Texas A&M** researchers have discovered a non-invasive method to detect changes in colon cells before a person gets colon cancer.

- **Faking out fat.** The average American consumes 37 percent of calories from fat, more than the 30 percent recommended. Agricultural researchers are creating fat substitutes and using molecular science to understand how body fat is regulated. **Georgia** scientists have created a fat substitute that lowers cholesterol by 50 percent and boosts the immune system by increasing the T-cells by 19 percent – an important finding for treating people with AIDS who have low T-cell counts and for people with high cholesterol levels.

- **Healthier foods, a healthier you. Virginia Tech** nutrition researchers used Virginia soft red winter wheat and starch-related enzymes to create a muffin that has 75 percent less fat but all the flavor of a regular muffin. Many Virginia bakeries are selling the low-fat creation. **Wisconsin** poultry scientists have developed a method to produce vitamin E enriched eggs with 25 percent less fat and cholesterol than regular eggs. The eggs are sold under the name Eggstasy ™ in 25 states.

Cooperative State Research, Education, and Extension Service
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